

Amendment to the Claims:

1. (Currently Amended) A magnetic resonance imaging method for forming an image of an object from a plurality of signals sampled in a restricted homogeneity region of a main magnet field of a magnetic resonance imaging apparatus, wherein a patient disposed on a table is moved continuously through the bore of the main magnet and spins in a predetermined area of the patient are excited by an excitation pulse from a transmitter antenna, such that an image is formed over a region exceeding largely the restricted region, wherein data is undersampled in the restricted region by means of at least ~~one~~ two receiver antennas in a plurality of receive situations being defined as a block of measurements contiguous in time having preserved magnetisation and presaturation conditions within the excited area of the patient, and fold-over artefacts due to said undersampling are unfolded by means of the sensitivity pattern of the receiver antennas ~~and/or the properties of selected factors determining said receive situations.~~

2. (Currently Amended) A magnetic resonance imaging method for forming an image of a region of a patient that is larger than a restricted homogeneity region of a main magnet field of a magnetic resonance imaging apparatus from a plurality of parallel imaging signals sampled in the restricted homogeneity region, the method comprising:

continuously moving a patient through the restricted homogeneity region of the main magnet field;

exciting spins in an area of the patient in the restricted homogeneity region with an excitation profile as the patient moves through the main magnetic field,

undersampling resonance data in the restricted homogeneity region with parallel receiver antennae which each have a sensitivity pattern as the patient moves through the main magnet field to define a block of measurements contiguous in time having preserved magnetisation and presaturation conditions within the excited region of the patient; and

generating the image of the region of the patient that is larger than the restricted homogeneity region including unfolding fold-over artifacts due to [(a)] the

undersampling using (a) the sensitivity patterns of the receiver antennae and (b) at least one of:

- 20 the excitation profile,
 a magnetization and presaturation profile, and
 a frequency-response pattern of a receiver.

3. (Currently Amended) A method as claimed in Claim 1, wherein the fold-over artefacts are unfolded by means of the magnetisation and presaturation profile ~~as selected factor~~.

4. (Currently Amended) A method as claimed in Claim 1, wherein the fold-over artefacts are unfolded by means of the frequency-response pattern of the receiver ~~as selected factor~~.

5. (Currently Amended) A method as claimed in Claim 1, wherein during parallel image sampling of data within the restricted homogeneity region the table is moved over at most one half of the size of the restricted homogeneity region.

6. (Currently Amended) A magnetic resonance imaging method comprising:

forming a restricted homogeneity region of a main magnet field with a main magnet system of a magnetic resonance imaging apparatus;

5 continuously moving a patient disposed on a table through the restricted homogeneity region of the main magnet system;

 exciting spins in a predetermined area of the patient with excitation pulses from a transmitter antenna as the patient moves through the restricted homogeneity region;

10 undersampling data from the restriction region with at least one global receiver antenna disposed in a fixed relationship to the main magnet system and a plurality of local receiver antennae disposed in a fixed relationship to the patient on the table to move therewith ~~to and~~ generate a block of parallel measurements

- contiguous in time having preserved magnetization and presaturation conditions
- 15 within the excited area of the patient;
- reconstructing the block of parallel measurements in order to generate images which have fold-over artifacts due to the undersampling, the generated images spanning an imaged region of the patient which is larger than the restricted homogeneity region; and
- 20 unfolding the fold-over artifacts using sensitivity patterns of the global and local receiver antennae.

7. (Currently Amended) A method as claimed in claim 6, wherein a reference scan is performed ~~for obtaining in order to obtain~~ the sensitivity patterns of the global and local receiver antennae.

8. (Previously Presented) A method as claimed in claim 7, wherein data is acquired in a number of discrete reference scan segments at different table positions in the restricted region, wherein during each reference scan the table stands still, and from the data obtained by the reference scans the sensitivity patterns of the
- 5 local receiver antennae are calculated.

9. (Previously Presented) A method as claimed in claim 7, wherein the table is moved at a speed which is less than half of the restricted homogeneity region of the main magnet system over the scan time of k-space, k-space being continuously scanned in a row-to-row manner, and the sensitivity profiles of the local
- 5 receiver antennae being calculated by interpolation of the measured profiles at different table positions.

10. (Currently Amended) A magnetic resonance imaging method for ~~forming~~configured to form an image of an object from a plurality of parallel imaging signals sampled in a restricted homogeneity region of a main magnet field of a magnetic resonance imaging apparatus, wherein a patient disposed on a table is
- 5 moved continuously through the bore of the main magnet and spins in a predetermined area of the patient are excited by an excitation pulse from a transmitter

antenna, such that an image is formed over a region exceeding largely the restriction region, wherein data is undersampled in the restriction region by means of at least ~~one~~ two receiver antennas in a plurality of receive situations being defined as a block of
10 undersampled measurements contiguous in time having preserved magnetization and presaturation conditions within the excited area of the patient[[,]] and fold-over artifacts due to said undersampling are unfolded by means of the sensitivity pattern of the receiver antenna ~~and/or the properties of selected factors determining said receive~~
15 ~~situations~~, wherein the sampled data is reconstructed in an iterative manner, in that data sampled largely offset of the centre of the main magnet, which is ~~folded-~~
~~in~~folded-in on the data sampled in the centre of the main magnet and is reconstructed to form a folded-in image, is purposely distorted such that an undistorted image is reconstructed and subtracted from the folded-in image.

11. (Currently Amended) A magnetic resonance imaging apparatus
~~for obtaining~~configured to obtain an MR image from a plurality of parallel imaging
signals comprising:

- 5 - a main magnet which generates a main magnet field having a restricted homogeneity region,
- a transmitter antenna ~~for excitation of which excites~~ spins in a predetermined area of the patient with an excitation profile,
- at least ~~one~~two receiver antennas which sample for sampling a
10 plurality of parallel imaging signals in a restricted homogeneity region of the main magnet field,
- a table ~~for bearing~~configured to bear a patient,
- means for continuously moving the table through the restricted homogeneity region of the main magnet field,
- means for adapting the frequency profile of the transmitter antenna
15 and the frequency profile of the receiver antenna to the position of the continuously moving table relative to a reference point during the parallel sampling of the parallel imaging signals,
- means for sampling the data from the spins excited in the restricted homogeneity region in a given receive situation being defined as a block of

20 measurements contiguous in time with preserved magnetisation and presaturation conditions in the excited area of the patient, and

- means for unfolding fold-over artefacts due to undersampling by means of the sensitivity pattern of the at least two receiver antennae and at least one of:

25 the excitation profile,
a magnetization and presaturation profile, and
a frequency-response pattern of at least one receiver that demodulates the data sampled by ~~the~~ at least one of the at least two receiver antennae.

12. (Currently Amended) A magnetic resonance imaging apparatus ~~for obtaining~~ configured to obtain an MR image from a plurality of signals comprising:

- a main magnet system which generates a main magnet field having
- 5 a restricted homogeneity region,
- a table ~~for bearing~~ configured to bear a patient,
- a means for continuously moving the table through a bore of the main magnet system,
- a transmitter antenna ~~for excitation of~~ configured to excite spins in a
- 10 predetermined area of the patient,
- a plurality of receiver antennae ~~for sampling~~ configured to sample a plurality of parallel imaging signals from the restricted homogeneity region in a given receive situation, the parallel imaging signals being defined as a block of measurements contiguous in time with preserved magnetization and presaturation
- 15 conditions in the excited area of the patient, the plurality of receiver antennae including at least one global receiver antenna disposed at a fixed relationship to the main magnet system and a plurality of local receiver antennae disposed in a fixed relationship to the patient on the table,
- a means for adapting a frequency profile of the transmitter antenna
- 20 and a frequency profile of the receiver antennae during the sampling of the parallel

imaging signals to the position of the continuously moving table relative to a reference point,

—means for sampling the data in the restricted homogeneity region in a given receive situation being defined as a block of measurements contiguous in time with preserved magnetization and presaturation conditions in the excited area of the patient; and

- means for unfolding fold-over artifacts due to undersampling by means of the sensitivity pattern of the receiver antennae.

13. (Currently Amended) A computer program product stored on a computer usable medium for forming an image , comprising a computer readable program means for causing the computer to control the execution:

- creating a main magnetic field by a main magnet,
- 5 - exciting spins in a predetermined area of the patient by a transmitter antenna,
- undersampling a plurality of parallel acquired signals in a restricted homogeneity region of the main magnet field by at least one two parallel imaging receiver antennas,
- 10 - continuously moving a table bearing a patient through a bore of the main magnet,
- adapting a frequency profile of the transmitter antenna and a frequency profile of the receiver antennas to the position of the continuously moving table relative to a reference point,
- 15 - ~~undersampling the data~~ the undersampling of parallel acquired signals in the restricted region in a given receive situation being defined as a block of measurements contiguous in time with preserved magnetisation and presaturation conditions in the excited area of the patient, and
- generating an image of a region of the patient longer than the restricted homogeneity region including unfolding fold-over artefacts due to said undersampling, the unfolding being in conjunction with the sensitivity patterns of the parallel imaging receiver antennas and at least one of:

the excitation profile,

25 a magnetization and presaturation profile, and
 a frequency-response pattern of a receiver that
 demodulates the signals sampled by the at least ~~one~~two receiver
 antennas.

14. (Previously Presented) A computer program product stored
on a computer usable medium for forming an image, comprising a computer readable
program means for causing the computer to perform the method as claimed in
claim 1.

15. (Previously Presented) A magnetic resonance imaging
apparatus having a processor programmed to perform the method as claimed in
claim 1.

16. (Previously Presented) The method as claimed in claim 1,
further including defining slices in a canted orientation to orient artifacts in a
preselected direction.